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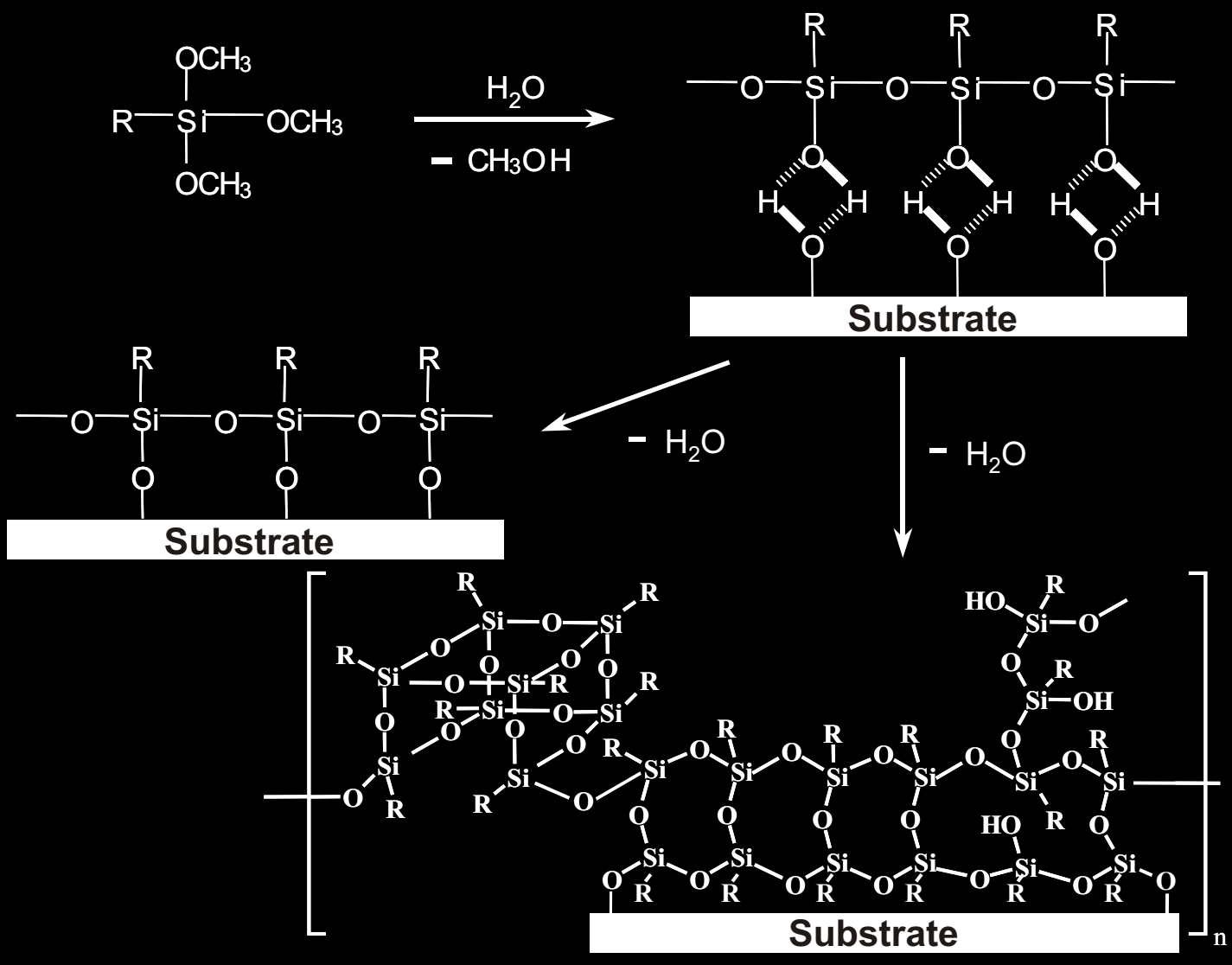

NIST
National Institute of Standards and Technology
Technology Administration, U.S. Department of Commerce

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The National Institute of Standards and Technology was established in 1988 by Congress to "assist industry in the development of technology ... needed to improve product quality, to modernize manufacturing processes, to ensure product reliability ... and to facilitate rapid commercialization ... of products based on new scientific discoveries."

NIST, originally founded as the National Bureau of Standards in 1901, works to strengthen U.S. industry's competitiveness; advance science and engineering; and improve public health, safety, and the environment. One of the agency's basic functions is to develop, maintain, and retain custody of the national standards of measurement, and provide the means and methods for comparing standards used in science, engineering, manufacturing, commerce, industry, and education with the standards adopted or recognized by the Federal Government.

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- Information Technology and Applications
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Manufacturing Extension Partnership Program
- Regional Programs
- National Programs
- Program Development

Electronics and Electrical Engineering Laboratory
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- Law Enforcement Standards
- Electricity
- Semiconductor Electronics
- Radio-Frequency Technology[1]
- Electromagnetic Technology[1]
- Optoelectronics[1]
- Magnetic Technology[1]

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- Ceramics
- Materials Reliability[1]
- Polymers
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- Surface and Microanalysis Science
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- Analytical Chemistry

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- Ionizing Radiation
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- Quantum Physics[1]

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- Manufacturing Metrology
- Intelligent Systems
- Fabrication Technology
- Manufacturing Systems Integration

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- Applied Economics
- Materials and Construction Research
- Building Environment
- Fire Research

Information Technology Laboratory
- Mathematical and Computational Sciences[2]
- Advanced Network Technologies
- Computer Security
- Information Access
- Convergent Information Systems
- Information Services and Computing
- Software Diagnostics and Conformance Testing
- Statistical Engineering

[1]At Boulder, CO 80303
[2]Some elements at Boulder, CO

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U.S. Department of Commerce—**Carlos M. Gutierrez,** Secretary
Technology Administration—**Michelle O'Neill,** Acting Under Secretary of Commerce for Technology
National Institute of Standards and Technology—**William Jeffrey,** Director

Cover: The cover illustration displays an idealized reaction of a trialkoxysilane with a substrate having silanol groups showing vertical condensation via hydrogen bonds to form covalent bonds to the substrate, as well as horizontal condensation to form polymeric siloxane structures. As described in the article by Antonucci et al in this issue, these orgonosilane intermediates, in the absence of substrates such as silica or similar minerals, or in the absence of hydroxyl-, amino-, or carboxylic acid-containing organic compounds, undergo a complex series of hydrolysis and self condensation reactions leading to dimers, trimers, tetramers, and ultimately oligomers and polymers designated as silsesquioxanes, $[RSiO_{3/2}]_n$. Cover illustration arranged by C. Carey.

The *Journal of Research of the National Institute of Standards and Technology*, the flagship periodic publication of the national metrology institute of the United States, features advances in metrology and related fields of physical science, engineering, applied mathematics, statistics, biotechnology, and information technology that reflect the scientific and technical programs of the Institute. The *Journal* publishes papers on instrumentation for making accurate measurements, mathematical models of physical phenomena, including computational models, critical data, calibration techniques, well-characterized reference materials, and quality assurance programs that report the results of current NIST work in these areas. Occasionally, a Special Issue of the *Journal* is devoted to papers on a single topic. Also appearing on occasion are review articles and reports on conferences and workshops sponsored in whole or in part by NIST.

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Articles